



THE UNIVERSITY *of* EDINBURGH

Edinburgh Research Explorer

Contributions of Scottish community woodlands to local wellbeing before and during the COVID-19 pandemic

Citation for published version:

Logan, MJ, Metzger, MJ & Hollingdale, J 2021, 'Contributions of Scottish community woodlands to local wellbeing before and during the COVID-19 pandemic', *Scottish Geographical Journal*.
<https://doi.org/10.1080/14702541.2021.1945670>

Digital Object Identifier (DOI):

[10.1080/14702541.2021.1945670](https://doi.org/10.1080/14702541.2021.1945670)

Link:

[Link to publication record in Edinburgh Research Explorer](#)

Document Version:

Publisher's PDF, also known as Version of record

Published In:

Scottish Geographical Journal

Publisher Rights Statement:

© 2021 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group

General rights

Copyright for the publications made accessible via the Edinburgh Research Explorer is retained by the author(s) and / or other copyright owners and it is a condition of accessing these publications that users recognise and abide by the legal requirements associated with these rights.

Take down policy

The University of Edinburgh has made every reasonable effort to ensure that Edinburgh Research Explorer content complies with UK legislation. If you believe that the public display of this file breaches copyright please contact openaccess@ed.ac.uk providing details, and we will remove access to the work immediately and investigate your claim.





Contributions of Scottish community woodlands to local wellbeing before and during the COVID-19 pandemic

Matthew J. Logan, Marc J. Metzger & Jon Hollingdale

To cite this article: Matthew J. Logan, Marc J. Metzger & Jon Hollingdale (2021): Contributions of Scottish community woodlands to local wellbeing before and during the COVID-19 pandemic, Scottish Geographical Journal, DOI: [10.1080/14702541.2021.1945670](https://doi.org/10.1080/14702541.2021.1945670)

To link to this article: <https://doi.org/10.1080/14702541.2021.1945670>



© 2021 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group



[View supplementary material](#)



Published online: 05 Jul 2021.



[Submit your article to this journal](#)



[View related articles](#)



[View Crossmark data](#)

Contributions of Scottish community woodlands to local wellbeing before and during the COVID-19 pandemic

Matthew J. Logan^a, Marc J. Metzger^a and Jon Hollingdale^b

^aSchool of Geoscience, The University of Edinburgh, Edinburgh, UK; ^bCommunity Woodlands Association, Forbes, UK

ABSTRACT

The COVID-19 pandemic has impaired wellbeing and highlighted the importance of open, local greenspaces in supporting healthy lifestyles and providing safe social spaces. Community woodlands, environments managed by and for communities, offer a wealth of individual and communal wellbeing benefits which are likely to have been affected by COVID-19 restrictions. A mixed-methods study, involving 31 semi-structured interviews and 765 questionnaire responses, was conducted in three Scottish community woodlands before and after Scotland's first lockdown in Spring of 2020. Findings suggest community woodlands are highly valued for providing opportunities to exercise and connect with nature but also provide a range of other social, communal and symbolic benefits. Following lockdown, respondents visited community woodlands more often, developed further interest and appreciation in community woodlands, and placed significantly more value on connecting with nature and relatively less on social and shared benefits. These results reflect the impact of national restrictions and highlight community woodlands as important local green spaces which, despite limitations on communal use, continue to support wellbeing throughout the COVID-19 pandemic.

ARTICLE HISTORY

Received 21 February 2021

Accepted 16 June 2021


KEYWORDS

COVID-19; wellbeing; community woodlands; community; woodlands; Scotland

Introduction

The COVID-19 pandemic continues to have a severe impact on global society and profound effects on physical and mental wellbeing (Holmes et al., 2020), with the psychosocial impacts of extended periods under lockdown restrictions leading to worsening mental health (O'Connor et al., 2020). Emerging global research has shown reductions in subjective wellbeing and increases in levels of depression, anxiety and stress (González-Sanguino et al., 2020; Wang et al., 2020; Zacher & Rudolph, 2021), caused by concerns about the pandemic and lifestyle limitations (Foa et al., 2020). Contrastingly, increases in exercise frequency amongst two thirds of those who rarely or never exercised before lockdowns were observed in 18 countries (Brand et al., 2020). Virus transmission precluded

CONTACT Matthew J. Logan  matthewjwlogan@yahoo.co.uk

 Supplemental data for this article can be accessed at <https://doi.org/10.1080/14702541.2021.1945670>

© 2021 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group

This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivatives License (<http://creativecommons.org/licenses/by-nc-nd/4.0/>), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is properly cited, and is not altered, transformed, or built upon in any way.

indoor meetings and has directly increased societal use of the outdoors (Day, 2020; Dominski & Brandt, 2020) with many sectors of society increasingly using outdoor spaces for exercise and enjoyment (Olsen & Mitchell, 2020).

On 23 March 2020, Scotland locked down to reduce COVID-19 transmission with a core 'stay at home' message from the Government. Restrictions included essential travel only, limiting outdoor exercise to once daily within five miles from home and prohibiting mixing with other households. After 28 May rules relaxed to allow travel beyond local areas and outdoor socialising (SPICe, 2021), mirroring similar measures around the world (Roser et al., 2020). In Scotland, various levels of restrictions have followed the initial lockdown with a consistent theme of remaining local, resulting in an increased use of local green spaces for exercise and wellbeing and growing recognition of the role of the outdoors in helping to de-stress, re-energise and improve physical health (NatureScot, 2020; Olsen & Mitchell, 2020). In England, a sharp increase in use of greenspace for recreation has been suggested to result from a lack of alternative uses of leisure time available and many of the population losing the time constraints of normal working schedules (Day, 2020; Office for National Statistics, 2021). Similar trends have been found internationally, with indications that across many European countries the desire to visit and access green space grew during the pandemic (Ugolini et al., 2020) and a 281% increase in outdoor recreational activity was estimated in Norway (Venter et al., 2020).

There is international recognition that Trees, Woods and Forests (TWF) provide essential services and products to support health and livelihoods during times of crisis, and investing in sustainable forest management and forestry jobs offer opportunities for a green recovery (Sen, 2020). Furthermore, there is extensive evidence that TWF contribute to improved wellbeing (Goodenough & Waite, 2020; O'Brien & Morris, 2014) by

Table 1. Typology of wellbeing benefits proved by trees, woods and forests. These categories were used to assess the wellbeing benefits provided by CWs (O'Brien & Morris, 2014). Extended typology in Appendix A.

Wellbeing Category	Wellbeing benefit
Health	Physical wellbeing Mental restoration Escape and freedom Enjoyment and fun
Nature/landscape connection	Sensory stimulation Nature connections Landscape improvements Screening/ shelter Gathering Sense of place
Education and Learning	Personal development Education and learning
Economy	Livelihoods Contribution to local economies
Social development and connections	Strengthening social relationships Creating new social relationships Participation and capacity building
Symbolic and cultural importance	Symbolic/cultural Sense of ownership Meaning and identity Religion and spiritual expression

supporting physical and mental health, educational and cultural experiences, nature and social connections (Table 1; Hartig et al., 2011). It is therefore pertinent to understand how forest management and governance can support and enhance these benefits. In this paper we focus on contributions of Scottish Community Woodlands (CWs) made to local wellbeing before and during the COVID-19 pandemic.

In recent decades, many international organisations, donors, NGOs, and governments have advocated for community forest management to improve local livelihoods and conserve forests around the world (Arts & de Koning, 2017). In Scotland, CWs are defined as woodlands that are partly or completely controlled by the local community, through a community woodland group (Community Woodlands Association, 2019). The woodland may be owned or leased by the group or managed in partnership with a public or private sector landowner enabling explicit interventions by communities to deliver local benefits and improve community wellbeing (Lawrence & Ambrose-Oji, 2015).

Scottish CWs, supported and represented by the Community Woodlands Association (CWA), are diverse in terms of scale, location, woodland type and the communities they serve (Lawrence & Ambrose-Oji, 2015). Their number has grown steadily since the mid-1990s: there are now around 200 CW Groups (CWGs) in Scotland, who between them own over 20,000 ha of woodland (Community Woodlands Association, 2020b). CWs comprise a significant strand of the broader land reform movement (Warren & McKee, 2011; Wong et al., 2015) which seeks to address Scotland's uniquely concentrated patterns of private land ownership and enhance local socio-economic development. Community ownership of land and associated assets is seen as a mechanism for facilitating community retention and growth, employment creation and capacity building: since 1990 the total area of community owned land has increased more than fivefold (Land Reform Review Group [LRRG], 2014; McMorran et al., 2018).

Increasing community involvement with, and ownership of, woodlands and forest is a priority action of Scotland's Forestry Strategy (Scottish Government, 2019). COVID-19 restrictions had a significant impact on CW activities such as volunteering and community events, however most CWs remained open for public recreation even as many other greenspaces were closed and likely played a role in easing the pressures on wellbeing associated with COVID-19 (Community Woodlands Association, 2020a).

This study explored the personal and community wellbeing benefits of CWs and the impact of COVID-19 on these benefits. Understanding the perceived community benefits as well as personal benefits is especially relevant given the aim of CWs to improve community well-being (Lawrence & Ambrose-Oji, 2015). Specifically, we address two Research Questions (RQs): What are the wellbeing benefits of community woodlands?; and Are these benefits valued differently during the COVID-19 pandemic?

Methods

This was a mixed-methods collective case study using grounded theory. Data handling followed the University of Edinburgh's ethical standards (The University of Edinburgh, 2019), consent forms were signed, interview participants assured of anonymity and data handled confidentially.

Case studies

Research focused on three CWs with at least five years of activity within 50 km of Edinburgh, for logistical reasons (Figure 1), specifically the Friends of Leadburn Community Woodland, Dalgety Bay Community Woodlands Group and Dunbar Community Woodland Group, referred to as Leadburn, Dalgety Bay and Dunbar. The three CWs

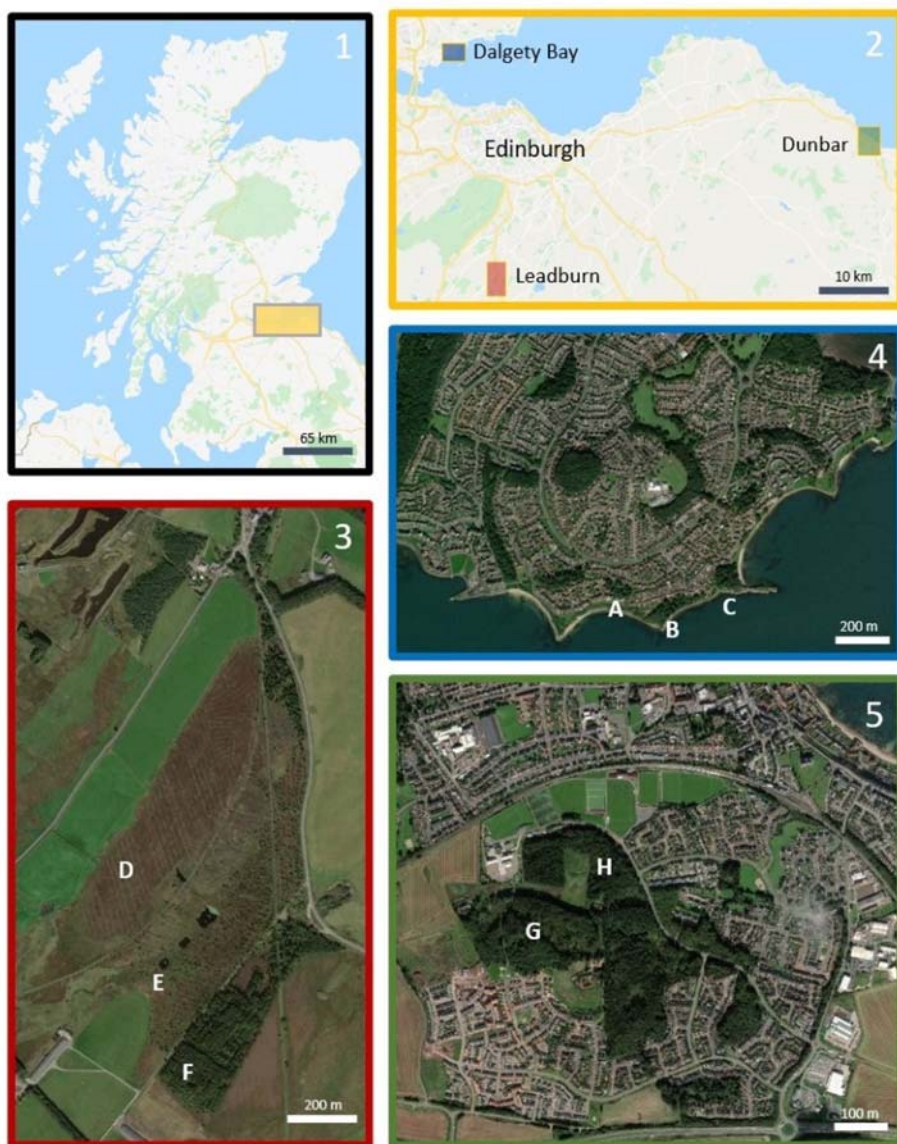


Figure 1. 1. Study region. 2. Case study locations in vicinity of Edinburgh. 3. Leadburn Community Woodland: D. Peat bog restoration. E. Reforesting native woodland. F. Recently purchased conifer block. 4. Dalgety Bay Community Woodlands: A. Crow Wood. B. Hopeward Wood. C. Bathing House Wood. 5. Lochend Woods: G. and H. Areas not managed by Dunbar CWG. Adapted from (Google, 2020).

share similar aims but focus their work on different issues reflecting their respective natures, histories, contexts and local community (Table 2), which allowed us to compare perceptions of wellbeing in each and understand if each CW was valued uniquely for contextual reasons.

Data collection

Data were gathered in two phases allowing insight into the impact of the initial COVID-19 lockdown:

- Phase 1: 23 January – 15 March, eight days before Scotland first entered lockdown
- Phase 2: 1 September – 17 October, during a period of reduced restrictions prior to stricter lockdown

The second research phase was not planned initially and contact details of respondents in Phase 1 were only recorded if they expressed an interest in the findings. We therefore could not track change in the same individuals, but some respondents from Phase 1 are likely to have completed the Phase 2 questionnaire as the same distribution channels were used.

Both phases used the same methodology with some amendments including simplifying semi-structured interviews and adding questionnaire questions which directly addressed the COVID-19 lockdown in Phase 2. In-person sampling was not appropriate during Phase 2 due to restrictions thus questionnaires were distributed through social media, membership email lists or via cards left at CWs (in the case of Leadburn) and Phase 1 respondents who had indicated an interest in the research were also contacted and asked to complete the Phase 2 questionnaire.

Research and analysis were conducted using the techniques and process outlined in Figure 2 and described below. Results from the two phases were compared using clustered bar charts and non-parametric statistics and responses to open questions were displayed using heat map tables. The semi-structured interviews and questionnaires provided rich insights addressing both RQs.

Table 2. Descriptive features of CWs selected as case studies. Information gathered from group websites and constitutions (Dalgety Bay Community Woodlands Group, 2019; Dunbar Community Woodland Group, 2017; Friends of Leadburn Community Woodland, 2020).

Case study	Aims	Characteristics	Year formed	Size (ha)
Leadburn	‘Creating a diverse environment and community space’	Clear felled conifer plantation currently undergoing habitat restoration with native reforestation and raised bog restoration	2005	53
Dalgety Bay	‘Supporting ecology, increasing community use, engagement and awareness of the woodlands’	Three broadleaf woodlands including a section of the Fife Coastal Path (FCP) with native flora and cleared of invasive species	2013	2.17
Dunbar	‘Maximising potential for educational and recreational use whilst supporting ecology and increasing community engagement and awareness’	A section of the mixed woodland Lochend Wood, featuring pathways, native species and space to host events such as woodland craft days	2001	18

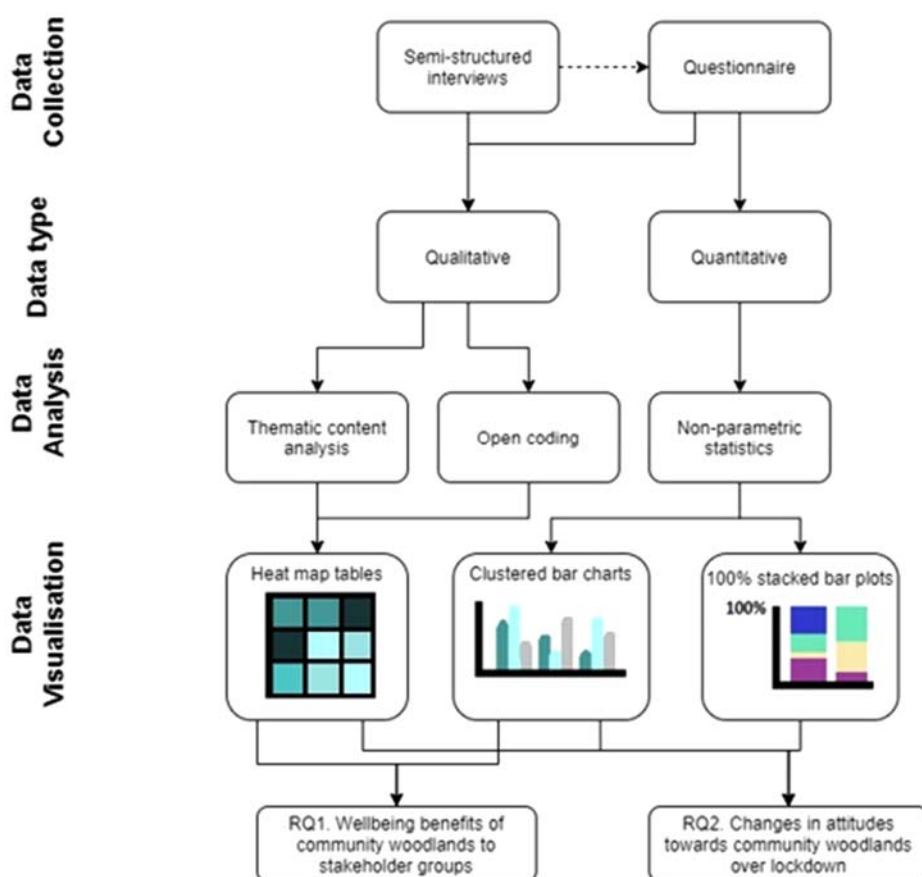


Figure 2. Representation of the methods. Dotted line indicates that open coding of interview transcripts informed questionnaire design.

Semi-structured interviews

CWG committee members were interviewed to elicit attitudes, motivations and opinions based on their insights into CWs. These semi-structured interviews were conducted by phone before the questionnaires were sent out using a set of themed questions with an ad-hoc approach (Appendix B). The interviews provided local context on each CW, highlighting key themes around CW use and the impact of Covid-19, and informed questionnaire design and survey strategy. CW benefits mentioned were included as multiple-choice options, and interviewees suggested locations with high footfall for in-person sampling.

Intelligent verbatim transcription of recordings was conducted with NVivo 12 (QSR International, 2020) using transcription, open coding, and thematic content analysis (TCA). The percentage of participants from each case study who identified each benefit as important either personally or for the community was calculated. Example transcript and consent forms can be found in Appendix B.

Questionnaires

Questionnaires were created using the ‘Online Surveys’ platform (Jisc, 2020). Sixteen questions were included across four sections (Appendix C) with open and closed questions used to gather complementary data. A ‘mixed-modes’ distribution approach was taken to balance the biases of each method, involving physical, online and in-person distribution of the questionnaire.

To improve the validity of comparisons between this study and previous work, the benefits selected in Q8 and Q9 (Table 4), were grouped based on O’Brien and Morris’s typology (Table 1 and Appendix A).

The methods used to analyse interview transcripts were also applied to open question responses and TCA was used to quantify which categories from the TWF wellbeing typology (Table 1) were most frequently mentioned. As with the interviews, respondents were first asked an open question about benefits from the CW before being presented with a list. The list used in questionnaires was informed by literature reviews and semi-structured interviews. Open questions allowed respondents to give initial reactions without any guiding and following this with a list ensured possible benefits were not forgotten, gathering responses on a wider range of benefits.

Quantitative analysis was carried out using SPSS 25.0 (IBM Corp, 2017). Responses were compared across case studies, gender and age. Response data were nominal and not normally distributed, thus non-parametric statistics were appropriate. Chi-squared tests (CHI) were used when possible, with Fisher’s Exact Test (FET) used when independent and dependent variables were categorical and the expected frequency of responses were too low for CHI. A Bonferroni correction was applied as multiple comparisons were carried out. The difference between personal and community valuation was tested with a Wilcoxon signed-rank test as two related measurements were being compared.

Results

Study reach

In Phase 1, 16 CWG committee members were interviewed (Leadburn 5; Dalgety Bay 5; Dunbar 6) and 553 people completed the questionnaire (Leadburn 143; Dalgety Bay 213; Dunbar 197). In Phase 2, interviews were repeated with 15 of the original participants and the survey completed by 196 (Leadburn 62; Dalgety Bay 47; Dunbar 87). There were a few biases in the respondents as summarised in Appendix C. Most notably, there was a gender imbalance (59% female respondents), and people aged 40–64 and over 65s were overrepresented.

Woodland use

Woodland use varied between case studies and research phases (Table 3). Dunbar had the most daily visitors, Dalgety Bay the most visiting multiple times a week or a month, and Leadburn the most visiting multiple times a year but not monthly. The majority of respondents (74%) visited more than once a year, but few (15%) visited daily. Half of all respondents (50%) lived within close proximity of the CW.

Table 3. Characteristics of community woodland use. 'Distance of home from woodland' was categorised in miles for Leadburn due to its rural location and in minutes walking for Dalgety Bay and Dunbar as they are within towns. Ph1 = Phase 1 sample and Ph2 = Phase 2 sample.

		Leadburn (%)		Dalgety Bay (%)		Dunbar (%)		Total (%)	
		Ph1	Ph2	Ph1	Ph2	Ph1	Ph2	Ph1	Ph2
Frequency of visits	Daily	1	2	15	17	23	25	15	15
	>Once a week< Daily	10	7	29	38	30	30	25	25
	>Once a month< Weekly	8	9	32	30	19	31	22	29
	>Once a year<Monthly	33	48	16	15	17	12	21	24
	Once a year	17	5	2	0	5	0	6	2
	< Once a year	13	2	3	0	4	2	5	2
	Never	18	9	3	0	2	0	6	3
Distance travelled	<5 miles/ minutes	53	73	62	57	58	59	59	63
	<10 miles/ minutes	40	19	24	32	35	34	31	30
	<30 miles/out with town	6	8	14	10	7	5	10	8
	>30 miles	2	0	0	0	0	0	0	0
Response to 'How often have you visited the CW following lockdown?									
	More often	NA	24	NA	34	NA	51	NA	39
	Same as before	NA	51	NA	40	NA	32	NA	40
	Less often	NA	25	NA	25	NA	17	NA	21

The frequency of woodland visits increased over lockdown. The proportion of respondents who visited CWs more than once a year increased by at least 8% in each case study between Phases 1 and 2. The proportion of respondents visiting more than once a month but not weekly significantly increased at both Leadburn (17%, $p = .001$, CHI) and Dunbar (12%, $p = 0.041$, CHI), as did the proportion of people visiting more than once a week but not daily in Dalgety Bay (10%) although this was not significant. When responses were pooled, significantly more people reported visiting more than once a month but not weekly in Phase 2 (7%, $p = 0.49$, CHI) and significantly less reported visiting once a year (4%, $p = 0.032$, CHI) or less (3%, $p = 0.24$, CHI).

Most respondents reported visiting CWs as frequently or more often following lockdown (Table 3). At Leadburn, a near equal proportion of respondents reported visiting more or less often. In Dalgety Bay and Dunbar, more respondents reported visiting more often than less often (10% and 34% respectively).

RQ1. What are the wellbeing benefits of community woodlands?

Results from Phase 1 confirm that CWs provide benefits from every category of the TWF wellbeing typology (Table 4). In every case study the most mentioned categories were physical wellbeing ($\geq 22\%$) and nature connections ($\geq 21\%$) and the least mentioned were education and learning ($\leq 7\%$) and social and community development ($\leq 6\%$). Mental wellbeing and landscape improvements were mentioned less at Leadburn ($\leq 11\%$) than elsewhere ($\geq 15\%$) but the symbolic and cultural importance category was mentioned more at Leadburn (20%) than elsewhere ($\leq 12\%$). All other categories were mentioned similar amounts in each case study.

Personal benefit

Physical wellbeing was the most important category in all case studies (Figure 3). In Phase 1, Landscape improvements were significantly more important at Leadburn

Table 4. Categories of wellbeing benefits provided by community woodlands. With the % of total mentions and illustrative quotes. Cells coloured in relation to (Key). Data gathered from both semi structured interviews and open survey questions.

Wellbeing Category	Leadburn (n=61)	Dalgety Bay (n=50)	Dunbar (n=93)	Total (n=204)	Illustrative quote
Physical wellbeing	29	31	22	27	"Beautiful space to walk and run with thriving plants and wildlife"
Mental wellbeing	10	16	19	15	"Relaxation and calm just being in or near woodlands"
Nature connections	21	21	22	22	"Its just somewhere you can go out and be in contact with the environment and nature and relax in peace"
Landscape improvements	11	16	15	14	"It is good to see like-minded people enjoying and working to improve the environment"
Education and learning	3	6	7	5	"There's all sorts of wildlife so you've got education for new generations very close to home"
Social Development	6	5	3	5	"I enjoy volunteer days partly as a way of meeting people you wouldn't otherwise meet"
Symbolic and cultural importance	20	6	12	12	"I think even if people don't visit, they are happy knowing that there's a place like that nearby"

Key:	1% - 4%	5% - 9%	10% - 14%	15% - 19%	20% - 29%	30%+
------	---------	---------	-----------	-----------	-----------	------

(28%) than elsewhere ($\leq 14\%$; $p < 0.01$, FET). Physical wellbeing was significantly more important in Dalgety Bay (39%) than elsewhere ($\leq 33\%$; $p < .001$, FET). Education and learning (11%) and Social and community development (10%) were significantly more important in Dunbar than elsewhere ($\leq 5\%$; $p < .001$, FET). Comparisons between gender and age groups revealed no significant differences. There were no significant differences between case studies in Phase 2.

Community benefit

Physical wellbeing was recognised as the most important category for communities (33%) (Figure 3). In Phase 1, Education and learning was significantly more important in Dalgety Bay (10%) than Leadburn (5%; $p = 0.049$, FET) and also higher in Dunbar (9%) than Leadburn. Valuation of community benefits did not change significantly between Phases 1 and 2 with no deviations of more than 5% between Phases 1 and 2.

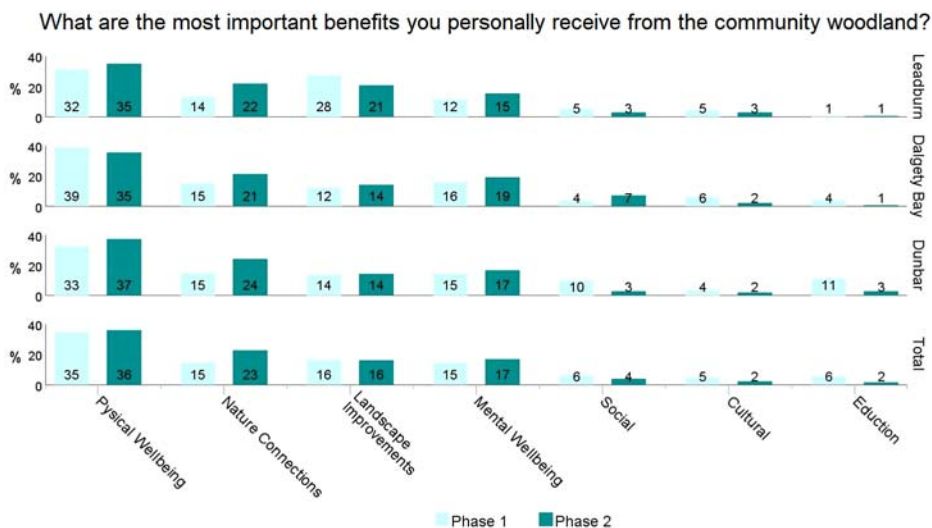


Figure 3. Clustered bar chart showing the personal importance of CW wellbeing benefit categories in three different CWs during Phase 1 and Phase 2.

Comparison of personal and community benefits

Across all Phase 1 respondents, education and learning was significantly more important for communities (9%) than personally (6%), ($z = -3.005$, $p = 0.014$). This difference was significant in Leadburn ($z = -3.273$, $p = 0.007$) and Dalgety Bay ($z = -4.608$, $p < .001$) but not in Dunbar. Social and community development was also significantly more important for communities (11%) than personally (6%), ($z = -4.073$, $p < .001$). Again, this applied to in Leadburn ($z = -3.233$, $p = 0.007$) and Dalgety Bay ($z = -4.906$, $p < .001$) but not Dunbar. Landscape improvements were significantly more important as personal benefits (28%) than community benefits (16%), ($z = -3.806$, $p < .001$) at Leadburn. In Dalgety Bay, physical wellbeing was more important as a personal benefit (39%) than a community benefit (30%), ($z = -3.783$, $p < .001$). In all cases effect sizes were moderate ($r < 0.3$).

RQ2. Are these benefits valued differently during the COVID-19 pandemic?

Physical wellbeing remained the most important category in all case studies amongst Phase 2 responses (Figure 3). At Leadburn, Nature Connections were significantly more important in Phase 2 (22%) than Phase 1 (14%: $p = 0.042$, FET). In Dunbar, Nature Connections were significantly more important in Phase 2 (24%) than Phase 1 (15%: $p < .001$, FET) and both Education (3%) and Social and community benefits (3%) were significantly lower in Phase 2 than Phase 1 (11% & 10%: $p < .001$, FET). There were no significant differences between phases in Dalgety Bay. When pooling responses across case studies, Physical wellbeing and Nature connections were both significantly more important in Phase 2 ($p < .001$, FET). Education was significantly less important following the lockdown ($p = 0.007$, FET).

Changes in appreciation and use

The majority of respondents ($\geq 62\%$) in all case studies felt their appreciation of the CW had not changed following the lockdown. The remaining respondents (22–28%) felt that there had been a change in their appreciation. In Leadburn and Dunbar this related to appreciating nature and quiet spaces (15% & 8%) or developing an interest in volunteering (10% & 8%), in Dalgety Bay feeling more supportive of the CWG (14%) and appreciating nature and quiet spaces more (12%).

Most respondents ($\geq 61\%$) felt their use of the CW had not changed following the lockdown. At least a quarter of all respondents (26–39%) felt their use of the CW had changed. The most reported change was an increase in exercise or undertaking of a new activity. Spending more time with families and using CWs to achieve a sense of calm was also mentioned in all case studies, as was using the CWs less frequently due to concerns around their increased footfall.

Table 5. Responses to two open questions relating to changes in CW use over lockdown. Colour coded in relation to Key. Data gathered during questionnaire.

	% of mentions			
	Leadburn (n=61)	Dalgety Bay (n=50)	Dunbar (n=93)	Total (n=204)
Has your appreciation for the CW changed since lockdown?				
No change	76	62	78	72
More supportive of group	0	14	6	7
More interested in work of CWG	0	5	0	1
More appreciation of nature and quiet spaces	15	12	8	11
Interest in volunteering	10	7	8	8
How has your use of the CW changed since lockdown?				
No change	74	61	70	68
Less usage due to restricted car use	5	0	0	1
Less usage due to busyness of woods	2	5	6	5
Spending more family time at woods	2	2	2	2
More exercising or a new activity	12	25	19	19
Key: 0% 1% - 4% 5% - 9% 10% - 19% 20% - 29% 30%+				

Table 6. Emergent themes and illustrative quotes from semi-structured interviews. More quotes provided in Appendix B.

Emergent Theme	Illustrative quote
Multi-faceted benefits of CWs	'On the anniversary of WWI we joined the Woodland Trust scheme to plant trees for every fallen soldier as have the site of former barracks in Bathing House Wood. We were granted 105 trees and then we involved the primary school in clearing and planting. The Royal Artillery sent a colonel along to talk about the history. He came down to the woods did some planting, gave a talk and read a poem written by one of the pupils.' Dalgety Bay CW Committee member
Increase in visitors over lockdown	'There's definitely more visitors with Covid. Almost immediately we started seeing more people. I think that snowballed a little bit to start with in that they would tell their friends. So, March and April we saw a little bit of an increase and in May and June it's been more again. So maybe double in April and May and doubled again in June and July.' Leadburn CW Committee member
Increase in family visitors	'I think that's probably right as I had noticed, earlier at the start of lockdown, lots of families walking. It was so noticeable! The number of people who were out walking and whole families out walking. That was the really significant thing that I noticed.' Dunbar CW Committee member
Visiting the CW more often	It changed in that the woodlands were one of the few places that I could go to and actually be outside and work so I was actually there more often that I would have otherwise' Leadburn CW Committee member
Visiting the CW less often	'there was a reluctance from myself and many others to walk through the woods due to the narrowness of the paths. And particularly all the nearby paths became very busy and personally we found other woods.' Dalgety Bay CW Committee member

Qualitative findings

Semi-structured interviews described CW use before and during the lockdown, highlighting some of the complexities of CW benefits and the impact of lockdown (Table 6). When recounting events or activities held at the CWs committee members described benefits from a variety of categories occurring simultaneously. During Phase

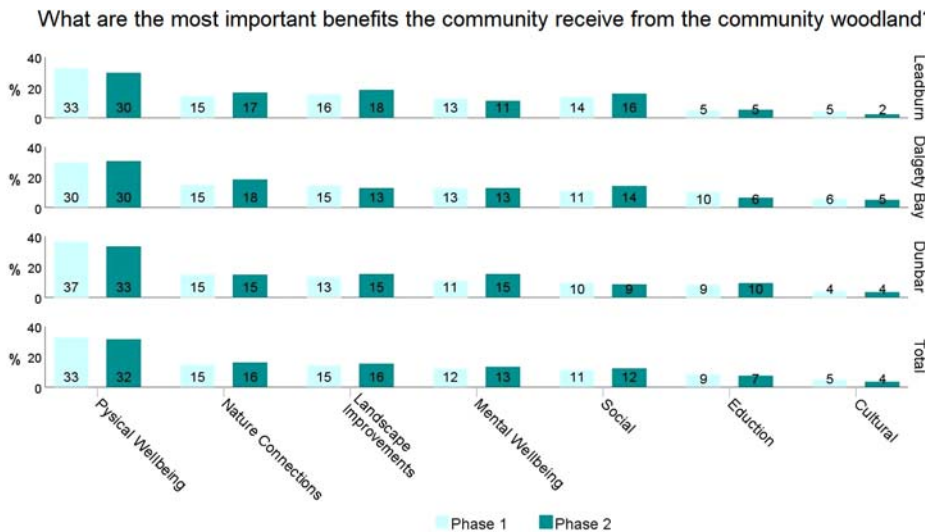


Figure 4. Clustered bar chart showing the community importance of CW wellbeing benefit categories in three different CWs during Phase 1 and Phase 2.

2 the impact of COVID-19 was readily apparent as CWG committee members mentioned the cancellation of events and adoption of online meetings. Many interviewees reported how much busier the woodlands had become during lockdown, aligning with trends within the questionnaire data, in particular a rise in family groups using the CW was noted. The dichotomy between those making more use of the CW and those visiting less due to COVID-19 was also pre-empted in the interviews as CWG committee members were evenly split between visiting CWs more, or less, during lockdown, with interviewees detailing a range of issues that may explain the wider trends.

Discussion

RQ1. What are the wellbeing benefits of community woodlands?

Physical wellbeing and connecting with nature were the most important benefits identified, although a wider range of individual and community wellbeing benefits were recognised (Table 4, Figures 3 and 4). These findings concur with previous research indicating that being in woodlands is particularly conducive to active and engaged exercise (Goodenough & Waite, 2020) and that connecting with nature contributes positively to both physical and mental health (O'Brien & Morris, 2014; White et al., 2019).

Qualitative findings revealed a rich and multifaceted complexity of CW experiences, reflecting the aims of CWGs (Table 2) and the added value of CWs compared to woodlands without strong links between users and those who manage them. For example, a tree planting event in Dalgety Bay illustrates the ability of CWs to benefit the community in a comprehensive way (Table 6).

Findings were similar across case studies, but the influence of local context is clear. Landscape improvements were significantly more important in Leadburn, with 14% more people selecting the benefit as important than elsewhere (Figure 3), possibly due to ongoing habitat restoration led by the CW committee and volunteers. Physical wellbeing was significantly more important in Dalgety Bay than elsewhere (Figure 3), possibly resulting from the Fife Coastal Path running through the woods. In Dunbar, Education and learning, and Social and community development, were significantly more important than other case studies (Figure 3), which could reflect the CWG's collaboration with the 'Muddy Buddies', a woodland based pre-school group, and a history of holding social community events within the CW.

Benefits relating to collective experiences were recognised as important for the community, despite being of less personal importance (Figures 3 and 4). Education, learning, socialising and community development were valued more as community benefits than as personal benefits in all case studies and significantly more in Leadburn and Dalgety Bay (Figures 3 and 4). This suggests that most users visit CWs for personal activities but appreciate the wider benefits CWs provide, aligning with observations of the contribution of forestry on a national level (Jamieson & Diggins, 2009).

The variation in how woodlands are valued shows the impact of management on woodland use and appreciation, something previously detailed for other TWF types (Edwards et al., 2009; Lawrence & Ambrose-Oji, 2015). Whilst the CWGs in this study do not aim to contribute to local wellbeing through economic benefits, many CWs elsewhere provide such benefits through employment, industry and attracting visitors, e.g.

Laggan Forest Trust manages a café at a mountain biking centre and others such as Knoydart Forest Trust and Kilfinan Community Forest carry out commercial forestry operations (Community Woodlands Association, 2020b; Lawrence & Ambrose-Oji, 2015).

RQ2. Are these benefits valued differently during the COVID-19 pandemic?

Following lockdown, the relative importance of individual benefits increased compared to collective benefits. Between the two research phases there were significant increases in the importance of physical wellbeing and nature connections and significant decreases in education and social and community benefits (Figure 3 and Table 5). Despite these trends most respondents did not feel their appreciation of CWs had changed over lockdown (Table 5), suggesting that changes in the relative importance of CW benefits happened either subconsciously or possibly due to differences in the respondents between phases. These findings are similar to those within Forest research's 'Engagement with nature and Covid-19 restrictions' study in which 60% of respondents reported feeling an increased connection to nature during the pandemic (O'Brien & Forster, 2020). Recent research shows a population wide increase in exercise frequency, particularly amongst those who were inactive before the pandemic (Brand et al., 2020; Ding et al., 2020), which may be partially driven by expert recommendations to remain physically active, and the allowance of one period of daily outdoor exercise (Sport England, 2020).

NatureScot (2020) observed increases in adults visiting the outdoors between August and September, compared to earlier in the year and 2019, possibly due to more local exploration following the introduction of travel restrictions and the lack of alternative activities to engage with during lockdowns (Day, 2020). Although changes in outdoor activity habits between winter and summer months are to be expected, Olsen and Mitchell (2020) found that 58% of Scottish adults intend to make more use of green and open space in the future suggesting that greenspaces such as CWs will be increasingly valued sources of wellbeing, especially as lockdowns continue, or return, throughout 2021. This would follow trends in sentiment towards urban green space across Europe, with those unable to access green space reporting to miss it 'a lot' and seeing open, local greenspace as increasingly important (Ugolini et al., 2020).

Although there was a general increase in frequency of woodland visits, experiences of committee members reveal the polarising effect of lockdown with some people visiting more often due to newfound time while others visited less due to concerns over distancing from other users and the need to avoid public spaces (cf. Tables 3 and 6). There may have been different trends in visiting frequency dependent on how much individuals valued or used greenspace before the pandemic, as observed by O'Brien and Forster (2020), however we did not explicitly ask this in our study.

Education and Social and community benefits both significantly decreased in priority in Dunbar between Phases 1 and 2 (Figures 3 and 4). This may reflect restrictions on group meetings prohibiting all non-essential CWG activity. Whilst collective activities and development remain key to CWs, COVID-19 has prevented the provision of these benefits. Whilst most attitudes remained unchanged, a small proportion (16%) expressed more interest in supporting, volunteering or learning more about CWs (Table 6), suggesting a revaluation of local green space during the pandemic.

There were fewer differences between case studies post lockdown, and contrary to Phase 1, the importance of benefits did not vary significantly between case studies in Phase 2 (Figure 3). This confirms the common need for exercise and connecting to nature during the pandemic. But it could also reflect the lack of specific community activities due to lockdown restrictions, which will have increased the relative use of the CWs for more universal benefits such as exercise and relaxation.

Methods and study design

The collective case study approach provided a wealth of information and possibilities for comparison. The mixed-methods design gave insight into the experiences of those actively involved with CWs alongside confirming wellbeing benefits of CWs. Although Phase 1 involved sampling door-to-door and randomly in public places many of the questionnaire respondents are likely to have some connection to the CW, as questionnaires were distributed by CWGs. Therefore, the 2nd sample is likely to be less representative. The frequency at which benefits were mentioned during open survey questions corresponded with the importance of the activity to the respondent.

The similarity of sample demographics in both research phases shows the robustness of the methodology and the survey reach of 553 in Phase 1 and 196 in Phase 2 demonstrates the effectiveness of the distribution methods. The inability to conduct in-person sampling has led to many fewer questionnaire responses during Phase 2 as the number of online responses in both Phases are similar. There was a slight over-representation of women and middle-aged people, a pattern commonly observed during surveys (Smith, 2008), which may reflect the demographics of CW users. Weighting responses to control for demographic imbalance was explored but could not be done reliably with our sample size.

Conclusion

Community woodlands represent explicit attempts to enhance local wellbeing, and respond to local needs and aspirations, delivered by dedicated and passionate volunteers. This study provides evidence that validates the wellbeing benefits of CWs and improves the understanding of the motivations and priorities of woodland users. The findings will be useful beyond Scotland and can help shape the emphasis of future management and may aid in recruitment of additional volunteers.

Community woodlands are valued by their users for providing a range of diverse benefits relating to physical and mental health; local environments; and educational, social and cultural wellbeing. Whilst there was a great deal of commonality in user valuation of all three woodlands observed in this study, inter-site comparisons revealed the impact of local context in appreciation of CWs and their specific community activities.

During lockdown, individuals' physical health benefits and ability to connect with nature were reported as having a higher priority for users, reflecting both increased use and constraints on social activities in woodlands. Whilst broader community benefits were given a lower priority by individual users during the pandemic, there was an appreciation of the ongoing value of these woodlands to the wider community.

Access to opportunities for outdoor recreation has been widely recognised as critical for maintaining physical and mental health during the COVID-19 pandemic. As COVID-19 restrictions continue community woodlands are playing a vital role in supporting local community wellbeing.

Acknowledgements

The authors would like to acknowledge all those who responded to the questionnaire and particularly the community woodland committee members who assisted with the research and participated in interviews. Their advice, insight and perspective on their local community woodlands was invaluable and their generosity in time and support during both research phases was huge. We would also like to acknowledge the anonymous referees who provided constructive comments and feedback whilst reviewing the paper.

Disclosure statement

The authors declare a potential conflict of interest as one of the authors is the CEO of the Community Woodland Association.

References

- Arts, B., & de Koning, J. (2017). Community forest management: An assessment and explanation of its performance through QCA. *World Development*, 96, 315–325. <https://doi.org/10.1016/j.worlddev.2017.03.014>
- Brand, R., Timme, S., & Nosrat, S. (2020). When pandemic hits: Exercise frequency and subjective well-being during COVID-19 pandemic. *Frontiers in Psychology*, 11, <https://doi.org/10.3389/fpsyg.2020.570567>
- Community Woodlands Association. (2019). *About the CWA*. <https://www.communitywoods.org/about-the-cwa>
- Community Woodlands Association. (2020a). *Community Woodlands Association 2020 conference report*. <https://static1.squarespace.com/static/5d121ae120f35b0001f8abb0/t/5fb4096b64315946b5745373/1605634417962/CWA+2020+Conference+Report.pdf>
- Community Woodlands Association. (2020b). *Map of woodlands*. <https://www.communitywoods.org/map-of-woodlands>
- Dalgety Bay Community Woodlands Group. (2019). *About Dalgety Bay Community Woodland Group – About*. <https://www.dbcwg.org/about>
- Day, B. H. (2020). The value of greenspace under pandemic lockdown. *Environmental & Resource Economics*, 76(4), 1161–1185. <https://doi.org/10.1007/s10640-020-00489-y>
- Ding, D., Del Pozo Cruz, B., Green, M., & Bauman, A. (2020). Is the COVID-19 lockdown nudging people to be more active: A big data analysis. *British Journal of Sports Medicine*, 54(20), 1183–1184. <https://doi.org/10.1136/bjsports-2020-102575>
- Dominski, F. H., & Brandt, R. (2020). Correction to: Do the benefits of exercise in indoor and outdoor environments during the COVID-19 pandemic outweigh the risks of infection? *Sport Sciences for Health*, 1, <https://doi.org/10.1007/s11332-020-00686-8>
- Dunbar Community Woodland Group. (2017, April 29). *Welcome to Lochend woods*. Lochend Woods. <https://dunbarwoods.org/>
- Edwards, D., Elliot, A., Hislop, M., Martin, S., Morris, J., O'Brien, L., Pearce, A., Sarajevs, V., Serrand, M., & Valatin, G. (2009). *A valuation of the economic and social contribution of forestry for people in Scotland*. Forestry Commission. <https://www.cabdirect.org/cabdirect/abstract/20133064061>
- Foa, R., Gilbert, S., & Fabian, M. O. (2020). *COVID-19 and subjective well-being: Separating the effects of lockdowns from the pandemic*. <https://dx.doi.org/10.2139/ssrn.3674080>

- Friends of Leadburn Community Woodland. (2020). *Leadburn Community Woodland*. Community Woodland, Leadburn | Online Borders. <https://onlineborders.org.uk/community/leadburnwood>
- González-Sanguino, C., Ausín, B., Castellanos, MÁ, Saiz, J., López-Gómez, A., Ugidos, C., & Muñoz, M. (2020). Mental health consequences during the initial stage of the 2020 Coronavirus pandemic (COVID-19) in Spain. *Brain, Behavior, and Immunity*, 87, 172–176. <https://doi.org/10.1016/j.bbi.2020.05.040>
- Goodenough, A., & Waite, S. (2020). *Engineering/engendering woodland wellbeing* (A. Goodenough & S. Waite, Eds.). Springer International Publishing. <https://doi.org/10.1007/978-3-030-32629-6>
- Google. (2020). *Google Maps*. Google Maps. <https://www.google.co.uk/maps>
- Hartig, T., van den Berg, A. E., Hagerhall, C. M., Tomalak, M., Bauer, N., Hansmann, R., Ojala, A., Syngollitou, E., Carrus, G., van Herzele, A., Bell, S., Podesta, M. T. C., & Waaseth, G. (2011). Health benefits of nature experience: Psychological, social and cultural processes. In K. Nilsson, M. Sangster, C. Gallis, T. Hartig, S. de Vries, K. Seeland, & J. Schipperijn (Eds.), *Forests, trees and human health* (pp. 127–168). Springer Netherlands. https://doi.org/10.1007/978-90-481-9806-1_5
- Holmes, E. A., O'Connor, R. C., Perry, V. H., Tracey, I., Wessely, S., Arseneault, L., Ballard, C., Christensen, H., Cohen Silver, R., Everall, I., Ford, T., John, A., Kabir, T., King, K., Madan, I., Michie, S., Przybylski, A. K., Shafran, R., Sweeney, A., ... Bullmore, E. (2020). Multidisciplinary research priorities for the COVID-19 pandemic: A call for action for mental health science. *The Lancet Psychiatry*, 7(6), 547–560. [https://doi.org/10.1016/S2215-0366\(20\)30168-1](https://doi.org/10.1016/S2215-0366(20)30168-1)
- IBM Corp. (2017). *Downloading IBM SPSS Statistics 25*. <https://www.ibm.com/support/pages/downloading-ibm-spss-statistics-25>
- Jamieson, N., & Diggins, G. (2009). *Public opinion of forestry*. Forest Research. <https://www.forestresearch.gov.uk/documents/3657/POFUK2009final.pdf>
- Jisc. (2020). *Online surveys*. <https://www.onlinesurveys.ac.uk/>
- Land Reform Review Group (LRRG). (2014). *The land of Scotland and the common good: Report*. Scottish Government Edinburgh. <https://www.gov.scot/publications/land-reform-review-group-final-report-land-scotland-common-good/>
- Lawrence, A., & Ambrose-Oji, B. (2015). Beauty, friends, power, money: Navigating the impacts of community woodlands. *The Geographical Journal*, 181(3), 268–279. <https://doi.org/10.1111/geoj.12094>
- McMorran, R., Lawrence, A., Glass, J., Hollingdale, J., McKee, A., Campbell, D., & Combe, M. (2018). *Review of the effectiveness of current community ownership mechanisms and of options for supporting the expansion of community ownership in Scotland*. <https://pure.sruc.ac.uk/en/publications/review-of-the-effectiveness-of-current-community-ownership-mechan>
- NatureScot. (2020). *Enjoying the outdoors: Monitoring the impact of Coronavirus and social distancing*. <https://www.nature.scot/enjoying-outdoors-monitoring-impact-coronavirus-and-social-distancing-latest-survey-results-october>
- O'Brien, L., & Forster, J. (2020). *Engagement with nature and Covid-19 restrictions*.
- O'Brien, L., & Morris, J. (2014). Well-being for all? The social distribution of benefits gained from woodlands and forests in Britain. *Local Environment*, 19(4), 356–383. <https://doi.org/10.1080/13549839.2013.790354>
- O'Connor, R. C., Wetherall, K., Cleare, S., McClelland, H., Melson, A. J., Niedzwiedz, C. L., O'Carroll, R. E., O'Connor, D. B., Platt, S., Scowcroft, E., Watson, B., Zortea, T., Ferguson, E., & Robb, K. A. (2020). Mental health and wellbeing during the COVID-19 pandemic: Longitudinal analyses of adults in the UK COVID-19 mental health & wellbeing study. *British Journal of Psychiatry*. doi:10.1192/bjp.2020.212.
- Office for National Statistics. (2021). *How has lockdown changed our relationship with nature?* <https://www.ons.gov.uk/economy/environmentalaccounts/articles/howhaslockdownchangedourrelationshipwithnature/2021-04-26>

- Olsen, J., & Mitchell, R. (2020). *S&SR Environments and Spaces Group: Change in use of green and open space following COVID-19 lockdown 'stay at home' phase and initial easing of lockdown*. <http://eprints.gla.ac.uk/223180/>
- QSR International. (2020). *NVivo Downloads*. Download Nvivo. <https://www.qsrinternational.com/nvivo-qualitative-data-analysis-software/support-services/nvivo-downloads>
- Roser, M., Ritchie, H., Ortiz-Ospina, E., & Hasell, J. (2020). *Policy responses to the coronavirus pandemic—statistics and research*. Our World in Data. <https://ourworldindata.org/policy-responses-covid>
- Scottish Government. (2019). *Scotland's forestry strategy 2019–2029*. <https://www.gov.scot/publications/scotlands-forestry-strategy-20192029/>
- Sen, M. (2020). Forests: At the heart of a green recovery from the COVID-19 pandemic. *UN Working Paper Series, UN Department of Economic and Social Affairs (DESA) Policy Briefs*. <https://doi.org/10.18356/ca7463ff-en>
- Smith, G. (2008). *Does gender influence online survey participation?: A record-linkage analysis of university faculty online survey response behavior*. <https://eric.ed.gov/?id=ED501717>
- SPICe. (2021, February 4). *Timeline of coronavirus (COVID-19) in Scotland – SPICe Spotlight | Solas air SPICe*. Timeline of Coronavirus (COVID-19) in Scotland. <https://spice-spotlight.scot/2021/01/29/timeline-of-coronavirus-covid-19-in-scotland/>
- Sport England. (2020, April 14). *New exercise habits forming during coronavirus crisis*. <https://www.sportengland.org/news/new-exercise-habits-forming-during-coronavirus-crisis>
- Ugolini, F., Massetti, L., Calaza-Martínez, P., Cariñanos, P., Dobbs, C., Ostoić, S. K., Marin, A. M., Pearlmutter, D., Saaroni, H., Šaulienė, I., Simoneti, M., Verlič, A., Vuletić, D., & Sanesi, G. (2020). Effects of the COVID-19 pandemic on the use and perceptions of urban Green space: An international exploratory study. *Urban Forestry & Urban Greening*, 56, 126888. <https://doi.org/10.1016/j.ufug.2020.126888>
- The University of Edinburgh. (2019). *Geosciences research ethics & integrity*. <https://www.ed.ac.uk/geosciences/research/research-support/research-ethics-integrity>
- Venter, Z. S., Barton, D. N., Gundersen, V., Figari, H., & Nowell, M. (2020). Urban nature in a time of crisis: Recreational use of Green space increases during the COVID-19 outbreak in Oslo, Norway. *Environmental Research Letters*, 15(10), 104075. <https://doi.org/10.1088/1748-9326/abb396>
- Wang, C., Pan, R., Wan, X., Tan, Y., Xu, L., Ho, C. S., & Ho, R. C. (2020). Immediate Psychological responses and associated factors during the initial stage of the 2019 Coronavirus disease (COVID-19) epidemic among the general population in China. *International Journal of Environmental Research and Public Health*, 17(5), 1729. <https://doi.org/10.3390/ijerph17051729>
- Warren, C. R., & McKee, A. (2011). The Scottish revolution? Evaluating the impacts of post-devolution land reform. *Scottish Geographical Journal*, 127(1), 17–39. <https://doi.org/10.1080/14702541.2011.579572>
- White, M. P., Alcock, I., Grellier, J., Wheeler, B. W., Hartig, T., Warber, S. L., Bone, A., Depledge, M. H., & Fleming, L. E. (2019). Spending at least 120 minutes a week in nature is associated with good health and wellbeing. *Scientific Reports*, 9(1), 7730. <https://doi.org/10.1038/s41598-019-44097-3>
- Wong, J., Lawrence, A., Urquhart, J., Feliciano, D., & Slee, B. (2015). *Forest land ownership change in United Kingdom*. European Forest Institute. https://aura.abdn.ac.uk/bitstream/handle/2164/4750/FP1201_Country_Report_UNITED_KINGDOM.pdf;jsessionid=E1A1109AF7323A3BD86E6E55534250F3?sequence=1
- Zacher, H., & Rudolph, C. W. (2021). Individual differences and changes in subjective wellbeing during the early stages of the COVID-19 pandemic. *American Psychologist*, 76(1), 50–62. <https://doi.org/10.1037/amp0000702>